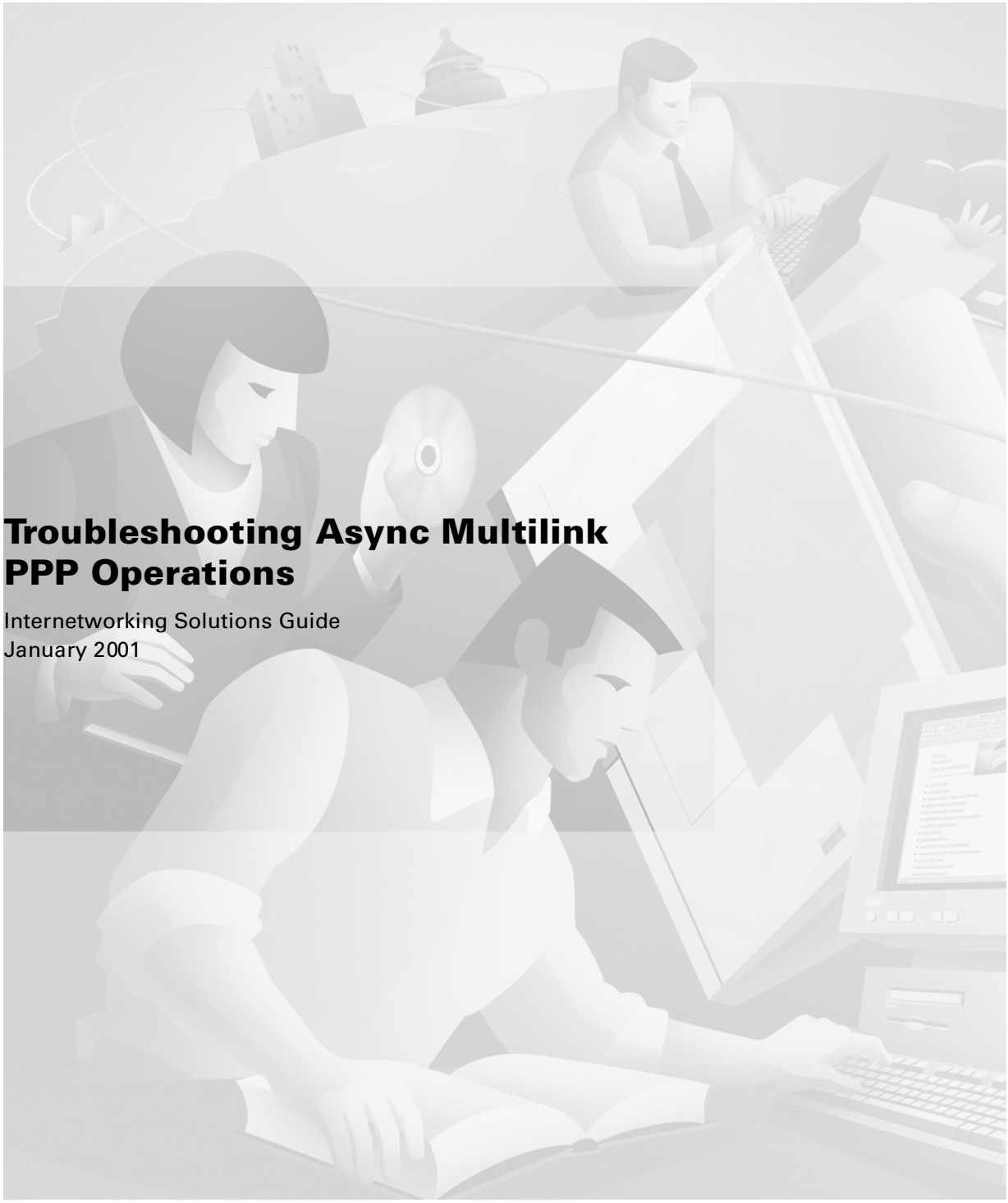

Troubleshooting Async Multilink PPP Operations

Internetworking Solutions Guide
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CHAPTER 1

Async Multilink PPP Troubleshooting Overview

In general, this document focuses on diagnosing and troubleshooting typical async multilink PPP problems. This chapter addresses the following topics:

- Overview of Async MPPP Network Arrangement
- Troubleshooting Basics for Async Multilink PPP

The two chapters that follow focus on these topics:

- Diagnosing and Troubleshooting Async Multilink PPP
- Async Multilink PPP Troubleshooting Diagnostic Output

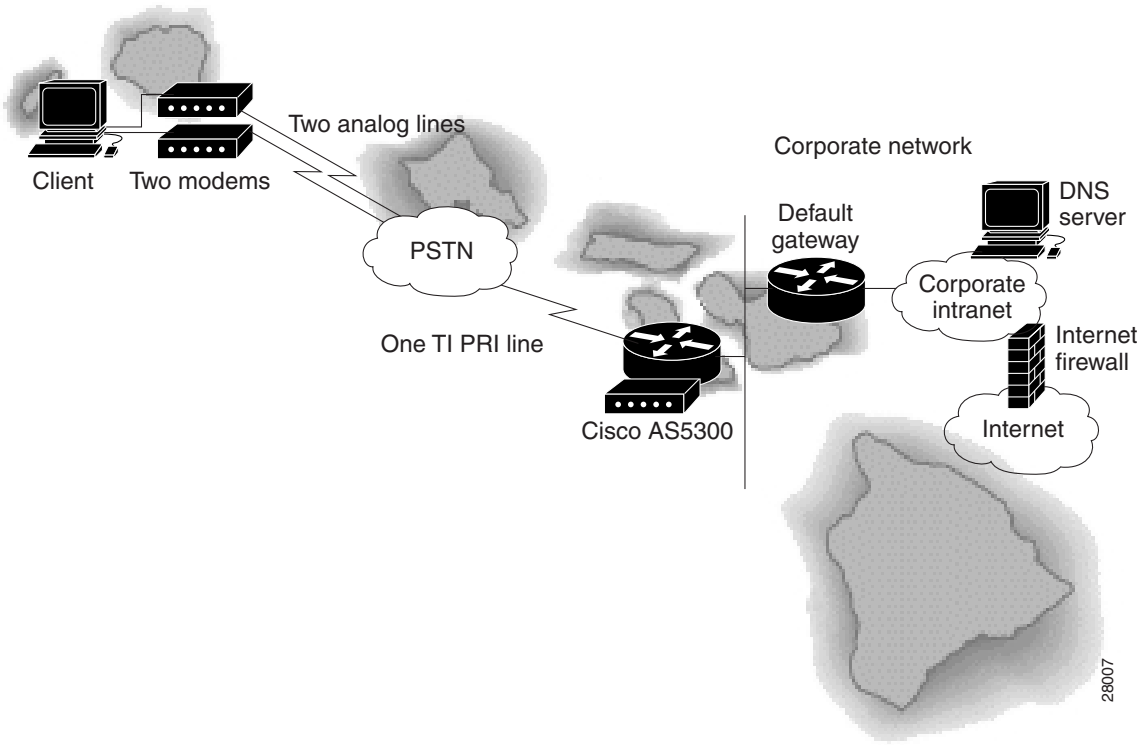
1.1 Overview of Async MPPP Network Arrangement

This document assumes that:

- Each PC client has access to two POTs lines.
- The Cisco AS5x00 already has its hardware commissioned, and all Cisco IOS basics are configured.

Figure 1-1 shows the network topology used for the remote node scenario. The remote LAN version differs in that instead of being connected to a PC client, the remote modems are connected to a Cisco router (such as a Cisco 2604).

Figure 1-1 Analog MPPP: Remote Node Services



1.1.1 Related Documents

The troubleshooting content provided in this document is based on content provided in two closely related documents:

- http://www.cisco.com/warp/customer/793/access_dial/router2router.html
- http://www.cisco.com/warp/customer/793/access_dial/async_multilink.html

1.2 Troubleshooting Basics for Async Multilink PPP

These sections help you to accomplish the following tasks:

- Troubleshooting Methodology Overview
- Cisco IOS Debug Command Summary

1.2.1 Troubleshooting Methodology Overview

The troubleshooting methodology adopted in this chapter follows these general steps:

1. Isolating the problem.
   - Gathering detailed information about problem.
   - Determining the starting point as well as fault isolation procedures.
2. Correcting the problem.
   - Making appropriate hardware, software, or configuration changes to correct the problem.
3. Verifying that the trouble is corrected.
   - Performing operational tests to verify that trouble is corrected.

The troubleshooting tables presented in "Diagnosing and Troubleshooting Async Multilink PPP" and the example scenarios presented in"Async Multilink PPP Troubleshooting Diagnostic Output" generally follow this methodology in listing typical symptoms, and provide associated problems and diagnostics measures.

1.2.2 Cisco IOS Debug Command Summary

Output from Cisco IOS **debug** commands provide a valuable source of information and feedback concerning state transitions and functions when assessing problems in an async MPPP environment.

Use the **debug** commands cited in the following documents for capturing async MPPP-related transitions and functions:

- `http://www.cisco.com/warp/public/793/access_dial/router2router.html#commands`
- `http://www.cisco.com/warp/public/793/access_dial/async_multilink.html#verification`

1.2.3 Troubleshooting Async MPPP Operational Problems

Async MPPP operational diagnostic activity for access environments is divided into the following basic areas:

- Remote client to central-site router access.
- Remote LAN to central-site router access.

In addition, *problems* can be separated as being associated with remote clients, remote routers, or central site NASs.

Because of similarities between symptoms and problems for these different situations, the following troubleshooting tables address these diagnostic topics collectively. As appropriate, differences between client, router, and NAS problems are called out separately.

The diagnostics summaries address the troubleshooting process using three basic stages:

1. Identifying symptoms
2. Isolating problems
3. Resolving problems

Each diagnostic table includes suggestions for identifying and isolating problems. Specific diagnostic output is included to illustrate how network entities react to failures and how to discern specific failures.

Note Some of the symptoms described in the following tables can be caused by a variety of problems other than async MPPP issues. Because this case study focuses on async MPPP-based topics, the problems and diagnostics provided here focus on async MPPP issues.

CHAPTER 2

Diagnosing and Troubleshooting Async Multilink PPP

This chapter focuses on diagnosing and troubleshooting typical async multilink PPP problems. This section reviews the case study environment.

2.1 Async MPPPTroubleshooting Tables

The following symptoms are addressed in separate tables in this section:

- Multilink fails
- Calls fail to connect
- Poor performance
- IP connectivity is down
- Phone calls last too long
- Calling too often
- Calling too infrequently
- Intermittent user access

Table 2-1 Multilink fails

Problem	Suggested Diagnostic Steps
Phone lines are not functional.	1. Dial the PSTN number of the central router; listen for modem trainup (squelch). 2. If this is a problem, you will not hear the dial tone or the squelch.
PC: Dialup Networking (DUN) version 1.2b or lower (or DUN not supported by client).	1. Determine if multilink is supported by version of PC DUN (in verification lab tests, a PC running Windows 95 was used). 2. Navigate to the Dial-Up Networking (DUN) folder. 3. Right click on one of the connections and view properties. 4. Verify that the multilink tab appears at the top of the window. 5. If not, upgrade to a more recent version of PC DUN.
PC: Second modem configured incorrectly.	1. Configure the client as discussed in the following document: • `http://www.cisco.com/warp/public/793/access_dial/async_multilink.html#config` 2. Ensure the prefixes are entered correctly. 3. Ensure second modem is added. 4. Ensure that target dial number is entered correctly. 5. Ensure that area code is not included for second modem. 6. Also, refer to this document: • `http://www.cisco.com/warp/public/76/modem_tuning.html`

Table 2-1 Multilink fails

Problem	Suggested Diagnostic Steps
Router: Modem failure	1. Reverse telnet to each modem separately. a. Refer to the following document for notes about reverse telnet: – `http://www.cisco.com/univercd/cc/td/doc/product/software/ios120/12cgcr/dial_c/dcrtelnt.htm` 2. Enter the `AT` command. 3. Look for `Ok` response. 4. If `Ok` is not returned, troubleshoot hardware for other problems. 5. For routers with external modems, enter the `ATM1` command to enable the modem's speaker. 6. Enter the `ATDT` command to verify that a dial tome can be detected by the modem. If you do not hear a dial tone, troubleshoot the modem. 7. Terminate `telnet` command. From the Cisco IOS command line, press `Ctrl-Shift-6`, then press the `x` key. 8. Enter `disconnect` at the Cisco IOS EXEC prompt.
Router: Cisco IOS version does not support Async MPPP	**Note** Async MPPP requires Cisco IOS 11.0(3) or higher 1. Use **show version** Cisco IOS EXEC command to ensure that software is Cisco IOS 11.0(3) or higher. 2. If not, upgrade to Cisco IOS 11.0(3) or higher.
Router: Configuration problems	Ensure that the configuration conforms to the basic command setup as illustrated in the following related document: • `http://www.cisco.com/warp/public/793/access_dial/router2router.html` • `http://www.cisco.com/warp/public/793/access_dial/async_multilink.html`

Table 2-2 Calls fail to connect

Problem	Suggested Diagnostic Steps
Call not answered	Refer to the following related site: • http://www.cisco.com/warp/public/112/chapter17.htm
NAS: Additional calls receive a busy signal	1. From the NAS, use the **show modem summary** Cisco IOS command to verify that modems are available. See the output provided in "Cisco IOS show modem summary Command Output" for additional information. 2. Verify that there are enough modems available.
PC: Authentication failure	1. Use the **debug ppp authentication** Cisco IOS command to determine if authentication failures are occurring. See the output provided in "Cisco IOS debug ppp authentication Command Output" for additional information. 2. If authentication failures are found, ensure that passwords and usernames are entered correctly.
Router: Modem failure	1. Reverse telnet to each modem separately. Refer to the following document for notes about reverse telnet: • http://www.cisco.com/univercd/cc/td/doc/product/software/ios120/12cgcr/dial_c/dcrtelnt.htm 2. Enter the AT command. 3. Look for Ok response. 4. If Ok is not returned, troubleshoot hardware for other problems. 5. For routers with external modems, enter the ATM1 command to enable the modem's speaker. 6. Enter the ATDT command to verify that a dial tome can be detected by the modem. If you do not hear a dial tone, troubleshoot the modem. 7. Terminate telnet command. From the Cisco IOS command line, press Ctrl-Shift-6, then press the x key. 8. Enter disconnect at the Cisco IOS EXEC prompt.

Table 2-2 Calls fail to connect

Problem	Suggested Diagnostic Steps
Router: Cisco IOS version does not support Async MPPP	**Note** Async MPPP requires Cisco IOS 11.0(3) or higher 1. Use **show version** Cisco IOS EXEC command to ensure that software is Cisco IOS 11.0(3) or higher. 2. If not, upgrade to Cisco IOS 11.0(3) or higher
Router: Configuration problems	Ensure that the configuration conforms to the basic command setup as illustrated in the following related document: • http://www.cisco.com/warp/customer/793/access_dial/router2router.html • http://www.cisco.com/warp/customer/793/access_dial/async_multilink.html

Table 2-3 Poor performance

Problem	Suggested Diagnostic Steps
NAS: MP not bundling **Note** Please refer to the following document for related information: `http://www.cisco.com/warp/public/131/mppp_bundle_name.html`	1. Use the **show ppp multilink** Cisco IOS command at the NAS and router to determine if bundling is occurring. See the output provided in "Cisco IOS show ppp multilink Command Output" for additional information. 2. Look for the *bundle* or *user* name. If bundling is occurring, a bundle with the associated user will appear. 3. If bundling is not occurring, use the **debug ppp negotiation** and **debug ppp multilink events** Cisco IOS commands to verify MRRU requests are occurring on both ends and whether a bundle is being created. See the output provided in "Cisco IOS debug ppp negotiation Command Output" for additional information. 4. If MRRU requests are not occurring on either end, ensure that **ppp multilink** interface configuration command is configured on all required interfaces. Disconnect existing links and reconnect. 5. If MRRU requests are being exchanged, but bundling is not occurring the refer to the following documents for Cisco IOS configuration information: – `http://www.cisco.com/warp/public/793/access_dial/router2router.html` – `http://www.cisco.com/warp/public/793/access_dial/async_multilink.html`
NAS: Fast switching is not working.	1. Use **show running-config** Cisco IOS command to verify that all the applicable interfaces do not have the following command: **no ip route-cache** 2. If this command is included, enable the **ip route-cache** interface configuration command on all applicable interfaces.

Table 2-3 `Poor performance`

Problem	Suggested Diagnostic Steps
NAS: Processor overhead	1. Use the **show processes cpu** Cisco IOS command at the NAS to determine CPU utilization. See the output provided in "Cisco IOS show processes cpu Command Output" for additional information. 2. If top line utilization number is approaching 100 percent, investigate CPU load issue. Refer to the following URL: `http://www.cisco.com/warp/public/63/highcpu.html`
PC: Dialup Networking (DUN) 1.3 or higher needed	PC DUN 1.3 was issued by Microsoft as a performance improvement over PC DUN 1.2. Refer to Microsoft technical support for additional information. Refer to this Microsoft document for details: • `http://microsoft.com/ntserver/nts/downloads/recommended/dun13win95/ReleaseNotes.asp`

Table 2-4 IP connectivity is down

Problem	Suggested Diagnostic Steps
NAS: MP not bundling	1. Use the **show ppp multilink** Cisco IOS command at the NAS and router to determine if bundling is occurring. See the output provided in "Cisco IOS show ppp multilink Command Output" for additional information. 2. Look for the *bundle* or *user* name. If bundling is occurring, a bundle with the associated user will appear. 3. If bundling is not occurring, use the **debug ppp negotiation** and **debug ppp multilink events** Cisco IOS commands to verify MRRU requests are occurring on both ends and whether a bundle is being created. See the output provided in "Cisco IOS debug ppp negotiation Command Output" for additional information. 4. If MRRU requests are not occurring on either end, ensure that **ppp multilink** interface configuration command is configured on all required interfaces. Disconnect existing links and reconnect. 5. If MRRU requests are being created, but bundling is not occurring the refer to the following documents for Cisco IOS configuration information: – `http://www.cisco.com/warp/customer/793/access_dial/router2router.html` – `http://www.cisco.com/warp/customer/793/access_dial/async_multilink.html`
Connection routing (if you cannot ping gateway from the client)	1. At the NAS, use the **show ip route** *client_ip_address* Cisco IOS command to determine whether the route exists to the remote client via the virtual access interface. See the output provided in "Cisco IOS show ip route Command Output" for additional information. 2. If the route does show up, determine whether you can ping from a remote client to the gateway of the NAS. 3. If this ping succeeds, problem is outside the NAS.

Table 2-5 Phone calls last too long

Problem	Suggested Diagnostic Steps
PC: User not using suspend/resume button in DUN screen.	When all connections are established, you can either view status information about the link by double-clicking on the "Communicating Computers" icon displayed in the taskbar, or you may disconnect the connection. Click on "Details" to verify that the connection is using multiple devices. When you select a device in the list box, a Suspend or Resume button appears. If a Suspend button appears, the device is now in use and *bundled* into the multilink connection. Clicking on the "Suspend" button disconnects that line and removes the line from the bundled connections. If the "Resume" button appears, click it to dial that connection and add that line to the bundle. You can dynamically suspend each connection without dropping the entire multilink session.
Router: Configuration tuning problems: • **dialer load-threshold** set too low • **dialer idle-timeout** set too long • Interesting traffic improperly defined • **ppp timeout multilink link remove** set too long	Refer to the following document for tuning notes related to these configuration commands: • `http://www.cisco.com/warp/customer/793/access_dial/router2router.html#tuning`

Table 2-6 Calling too often

Problem	Suggested Diagnostic Steps
Router: Configuration tuning problems: • **dialer load-threshold** set too low • **dialer idle-timeout** set too short • Interesting traffic improperly defined • **ppp timeout multilink link add** set too short	Refer to the following document for tuning notes related to these configuration commands: • `http://www.cisco.com/warp/customer/793/access_dial/router2router.html#tuning`

Table 2-7 Calling too infrequently

Problem	Suggested Diagnostic Steps
Router: Configuration tuning problems: • **dialer load-threshold** set too high • Interesting traffic improperly defined • **ppp timeout multilink link add** set too long	Refer to the following document for tuning notes related to these configuration commands: • `http://www.cisco.com/warp/customer/793/access_dial/router2router.html#tuning`

Table 2-8 Intermittent user access

Problem	Suggested Diagnostic Steps
Too few modems for application, lines are too busy	1. From the NAS, use the **show modem summary** Cisco IOS command to verify that modems are available. See the output provided in "Cisco IOS show modem summary Command Output" for additional information. 2. Verify that there are enough modems available.

Table 2-8 Intermittent user access

Problem	Suggested Diagnostic Steps
PC: Multiple users with same name attempting to access central site NAS. **Note** Please refer to the following document for related information: http://www.cisco.com/warp/public/131/mppp_bundle_name.html	1. If users are dialing in from multiple client PCs with the same user name, configure the Cisco IOS command **multilink bundle-name both** in the central site NAS configuration. This command forces the NAS to create a bundle consisting of the user name and the endpoint discriminator of the client. 2. Use the **show ppp multilink** command to verify that the bundle name includes both the user name and the endpoint discriminator. See the output provided in "Cisco IOS show ppp multilink Command Output" for additional information.
NAS: Telco hunt groups implemented at central site spanning multiple NASs.	1. Determine whether the Telco has implemented hunt groups and whether the hunt groups connect to multiple NASs at the the central site. 2. If the hunt group delivers calls to multiple NASs, then ensure that multichassis multilink PPP (MMP) is implemented correctly in the all the associated NASs. Refer to the following three documents for MMP configuration notes: • http://www.cisco.com/warp/public/131/3.html • http://www.cisco.com/warp/public/793/access_dial/multilink.html • http://www.cisco.com/warp/public/793/access_dial/6.html • http://www.cisco.com/univercd/cc/td/doc/product/software/ios113ed/113ed_cr/dial_c/dcprt7/dcmmp.htm

CHAPTER 3

Async Multilink PPP Troubleshooting Diagnostic Output

The diagnostic output provided in this chapter present examples illustrating the process of diagnosing problems addressed in "Async MPPP Troubleshooting Tables." Diagnostic output provided here includes the following:

- Cisco IOS show isdn status Command Output
- Cisco IOS debug isdn q931 Command Output
- Cisco IOS show modem summary Command Output
- Cisco IOS debug ppp authentication Command Output
- Cisco IOS show ppp multilink Command Output
- Cisco IOS debug ppp negotiation Command Output
- Cisco IOS show processes cpu Command Output
- Cisco IOS show ip route Command Output

You can use the *Output Interpreter* tool to analyze the output from some of the commands listed in this chapter. The *Output Interpreter* is available from the following page Cisco Connection Online:

- `http://www.cisco.com/support/OutputInterpreter/`

Refer to the *Output Interpreter* for a list of the commands it accepts.

3.1 Cisco IOS show isdn status Command Output

In the following example, the ISDN status messages are as expected: Layer 1 status is ACTIVE; Layer 2 status is in State=MULTIPLE_FRAME_ESTABLISHED.

Note Layer 1 must be in ACTIVE state and Layer 2 must be in STATE=MULTIPLE_FRAME_ESTABLISHED for a connection to be successfully completed.

```
NAS#show isdn status
    Global ISDN Switchtype = primary-5ess
    ISDN Serial0:23 interface
            dsl 0, interface ISDN Switchtype = primary-5ess
        Layer 1 Status:
            ACTIVE
        Layer 2 Status:
            TEI = 0, Ces = 1, SAPI = 0, State = MULTIPLE_FRAME_ESTABLISHED
        Layer 3 Status:
            0 Active Layer 3 Call(s)
        Activated dsl 0 CCBs = 0
        The Free Channel Mask:  0x807FFFFF
```

Refer to Table 2-2 for related symptom, problem, and diagnostic notes.

The following is the output interpreter result for the above output indicating that the connection is behaving properly.

```
========================================
SHOW ISDN STATUS NOTIFICATIONS (if any):
========================================

Layers 1 and 2 (Q.921) of the ISDN interfaces are operating normally.
```

Note Access the *Output Interpreter* from this location:
`http://www.cisco.com/support/OutputInterpreter/`

3.2 Cisco IOS debug isdn q931 Command Output

In the following example output, the NAS receives a call setup message from the switch. (If the NAS does not receive a setup message verify that the PRI is functioning correctly.) The NAS then transmits a call processing message. The last line of this output shows that the call is successfully connected.

```
NAS#debug isdn q931
ISDN Q931 packets debugging is on
NAS#
Aug 31 19:12:25.890 UTC: ISDN Se0:23: RX <-  SETUP pd = 8  callref = 0x015D
Aug 31 19:12:25.890 UTC:         Bearer Capability i = 0x9090A2
Aug 31 19:12:25.890 UTC:         Channel ID i = 0xA98381
Aug 31 19:12:25.890 UTC:         Called Party Number i = 0xC1, '3241937'
Aug 31 19:12:25.894 UTC: ISDN Se0:23: TX ->  CALL_PROC pd = 8  callref = 0x815D
Aug 31 19:12:25.894 UTC:         Channel ID i = 0xA98381
Aug 31 19:12:25.894 UTC: ISDN Se0:23: TX ->  ALERTING pd = 8  callref = 0x815D
Aug 31 19:12:25.998 UTC: ISDN Se0:23: TX ->  CONNECT pd = 8  callref = 0x815D
Aug 31 19:12:26.030 UTC: ISDN Se0:23: RX <-  CONNECT_ACK pd = 8  callref = 0x015D
Aug 31 19:12:26.030 UTC: ISDN Se0:23: CALL_PROGRESS: CALL_CONNECTED call id 0x190,
bchan -1, dsl 0
```

Refer to Table 2-2 for related symptom, problem, and diagnostic notes.

3.3 Cisco IOS show modem summary Command Output

In the following example command output, 48 available incoming modems and 48 available outgoing modems are detected.

```
NAS#show modem summary
Avg Hold     Incoming calls       Outgoing calls     Busied   Failed   No   Succ
  Time     Succ   Fail  Avail   Succ   Fail  Avail   Out      Dial     Ans  Pct.
00:00:24      1      0     48      0      0     48       0        0      0  100%
```

Refer to Table 2-2 for related symptom, problem, and diagnostic notes.

3.4 Cisco IOS debug ppp authentication Command Output

In the following example command output, the first and second connections are authencticated, but the third connection fails authentication.

```
NAS#debug ppp authentication
PPP authentication debugging is on
NAS#
Sep  1 13:11:27.683 UTC: As47 PPP: Treating connection as a callin
Sep  1 13:11:31.843 UTC: As47 CHAP: O CHALLENGE id 5 len 36 from "NAS"
Sep  1 13:11:32.019 UTC: As47 CHAP: I RESPONSE id 5 len 37 from "clearlake-lan-01"
Sep  1 13:11:32.019 UTC: As47 CHAP: O SUCCESS id 5 len 4
Sep  1 13:11:32.123 UTC: Vi3 PPP: Treating connection as a dedicated line
Sep  1 13:12:43.957 UTC: As35 PPP: Treating connection as a callin
Sep  1 13:12:48.041 UTC: As35 CHAP: O CHALLENGE id 5 len 36 from "NAS"
Sep  1 13:12:48.277 UTC: As35 CHAP: I RESPONSE id 5 len 37 from "clearlake-lan-01"
Sep  1 13:12:48.281 UTC: As35 CHAP: O SUCCESS id 5 len 4
NAS#
NAS#
Sep  1 13:16:36.802 UTC: As19 PPP: Treating connection as a callin
Sep  1 13:16:40.834 UTC: As19 CHAP: O CHALLENGE id 4 len 36 from "NAS"
Sep  1 13:16:41.026 UTC: As19 CHAP: I RESPONSE id 4 len 37 from "clearlake-lan-01"
Sep  1 13:16:41.026 UTC: As19 CHAP: Unable to validate Response.  Username
clearlake-lan-01: Authentication failure
Sep  1 13:16:41.026 UTC: As19 CHAP: O FAILURE id 4 len 26 msg is "Authentication
failure"
NAS#
NAS#
```

Refer to Table 2-2 for related symptom, problem, and diagnostic notes.

3.5 Cisco IOS show ppp multilink Command Output

The following **show ppp multilink** Cisco IOS command output illustrates a situation where a bundle was created using both username and endpoint discriminator and where the bundle has two member links.

```
NAS#show ppp multilink

Virtual-Access1, bundle name is clearlake-lan-01/b07502c88ec4420014be1fc1553700000
  0 lost fragments, 0 reordered, 0 unassigned, sequence 0x23/0x8 rcvd/sent
  0 discarded, 0 lost received, 1/255 load
  Member links: 2 (max not set, min not set)
    Async48
    Async46
```

Refer to Table 2-3,Table 2-4 and Table 2-8 for related symptom, problem, and diagnostic notes.

3.6 Cisco IOS debug ppp negotiation Command Output

The following output from **debug ppp negotiation** and **debug ppp multilink events** Cisco IOS commands combine to illustrates a situation in which a bundle was created using both username and endpoint discriminator and that the bundle has two member links.

Note If either end of the link does not support multilink (or is not properly configured for multilink), the **debug ppp negotiation** Cisco IOS command output will show a `CONFREJ` (a `REJect`) for MRRU and EndPoint Discriminator. If you see such an error output, ensure that your configuration is correct.

The **debug** command output example that follows illustrates the following events:

1. The MRRU is CONFACKed (agreed upon by both sides) for a connection.
2. The connection is virtualized.
3. A bundle is created (first link joins bundle).
4. A second connection attempted is detected.
5. The MRRU for the second connection is agreed upon by both sides.
6. The second connection is virtualized.
7. The second connection is added to multilink bundle

```
NAS#debug ppp negotiation
PPP protocol negotiation debugging is on
NAS#debug ppp multilink events
Multilink events debugging is on
NAS#
NAS#
NAS#show debug
PPP:
  PPP protocol negotiation debugging is on
  Multilink events debugging is on
NAS#
NAS#terminal monitor
NAS#
Sep  1 13:52:39.298 UTC: As2 IPCP: Install route to 172.21.104.25
Sep  1 13:52:41.299 UTC: As2 PPP: Treating connection as a callin
Sep  1 13:52:41.299 UTC: As2 PPP: Phase is ESTABLISHING, Passive Open
Sep  1 13:52:41.299 UTC: As2 LCP: State is Listen
Sep  1 13:52:42.287 UTC: As2 LCP: I CONFREQ [Listen] id 3 len 46
Sep  1 13:52:42.287 UTC: As2 LCP:    ACCM 0x000A0000 (0x0206000A0000)
Sep  1 13:52:42.287 UTC: As2 LCP:    MagicNumber 0x0042C48F (0x05060042C48F)
Sep  1 13:52:42.287 UTC: As2 LCP:    PFC (0x0702)
Sep  1 13:52:42.287 UTC: As2 LCP:    ACFC (0x0802)
Sep  1 13:52:42.287 UTC: As2 LCP:    Callback 6  (0x0D0306)
Sep  1 13:52:42.287 UTC: As2 LCP:    MRRU 1500 (0x110405DC)
Sep  1 13:52:42.287 UTC: As2 LCP:    EndpointDisc 1 Local
Sep  1 13:52:42.287 UTC: As2 LCP:     (0x131301B07502C88EC4420014BE1FC155)
Sep  1 13:52:42.287 UTC: As2 LCP:     (0x370000)
Sep  1 13:52:42.287 UTC: As2 LCP: O CONFREQ [Listen] id 12 len 47
Sep  1 13:52:42.291 UTC: As2 LCP:    ACCM 0x000A0000 (0x0206000A0000)
Sep  1 13:52:42.291 UTC: As2 LCP:    AuthProto CHAP (0x0305C22305)
Sep  1 13:52:42.291 UTC: As2 LCP:    MagicNumber 0xA53BCC27 (0x0506A53BCC27)
Sep  1 13:52:42.291 UTC: As2 LCP:    PFC (0x0702)
Sep  1 13:52:42.291 UTC: As2 LCP:    ACFC (0x0802)
Sep  1 13:52:42.291 UTC: As2 LCP:    MRRU 1524 (0x110405F4)
Sep  1 13:52:42.291 UTC: As2 LCP:    EndpointDisc 1 Local
Sep  1 13:52:42.291 UTC: As2 LCP:     (0x131201626F62736C616B652D6E61732D)
Sep  1 13:52:42.291 UTC: As2 LCP:     (0x3031)
Sep  1 13:52:42.291 UTC: As2 LCP: O CONFREJ [Listen] id 3 len 7
Sep  1 13:52:42.291 UTC: As2 LCP:    Callback 6  (0x0D0306)
Sep  1 13:52:44.287 UTC: As2 LCP: TIMEout: State REQsent
Sep  1 13:52:44.287 UTC: As2 LCP: O CONFREQ [REQsent] id 13 len 47
Sep  1 13:52:44.287 UTC: As2 LCP:    ACCM 0x000A0000 (0x0206000A0000)
Sep  1 13:52:44.287 UTC: As2 LCP:    AuthProto CHAP (0x0305C22305)
Sep  1 13:52:44.287 UTC: As2 LCP:    MagicNumber 0xA53BCC27 (0x0506A53BCC27)
Sep  1 13:52:44.287 UTC: As2 LCP:    PFC (0x0702)
Sep  1 13:52:44.287 UTC: As2 LCP:    ACFC (0x0802)
Sep  1 13:52:44.287 UTC: As2 LCP:    MRRU 1524 (0x110405F4)
Sep  1 13:52:44.287 UTC: As2 LCP:    EndpointDisc 1 Local
Sep  1 13:52:44.287 UTC: As2 LCP:     (0x131201626F62736C616B652D6E61732D)
Sep  1 13:52:44.287 UTC: As2 LCP:     (0x3031)
Sep  1 13:52:44.479 UTC: As2 LCP: I CONFACK [REQsent] id 13 len 47
Sep  1 13:52:44.479 UTC: As2 LCP:    ACCM 0x000A0000 (0x0206000A0000)
Sep  1 13:52:44.479 UTC: As2 LCP:    AuthProto CHAP (0x0305C22305)
Sep  1 13:52:44.479 UTC: As2 LCP:    MagicNumber 0xA53BCC27 (0x0506A53BCC27)
Sep  1 13:52:44.483 UTC: As2 LCP:    PFC (0x0702)
Sep  1 13:52:44.483 UTC: As2 LCP:    ACFC (0x0802)
Sep  1 13:52:44.483 UTC: As2 LCP:    MRRU 1524 (0x110405F4)
Sep  1 13:52:44.483 UTC: As2 LCP:    EndpointDisc 1 Local
Sep  1 13:52:44.483 UTC: As2 LCP:     (0x131201626F62736C616B652D6E61732D)
Sep  1 13:52:44.483 UTC: As2 LCP:     (0x3031)
Sep  1 13:52:45.279 UTC: As2 LCP: I CONFREQ [ACKrcvd] id 4 len 46
Sep  1 13:52:45.283 UTC: As2 LCP:    ACCM 0x000A0000 (0x0206000A0000)
```

```
Sep  1 13:52:45.283 UTC: As2 LCP:    MagicNumber 0x0042C48F (0x05060042C48F)
Sep  1 13:52:45.283 UTC: As2 LCP:    PFC (0x0702)
Sep  1 13:52:45.283 UTC: As2 LCP:    ACFC (0x0802)
Sep  1 13:52:45.283 UTC: As2 LCP:    Callback 6  (0x0D0306)
Sep  1 13:52:45.283 UTC: As2 LCP:    MRRU 1500 (0x110405DC)
Sep  1 13:52:45.283 UTC: As2 LCP:    EndpointDisc 1 Local
Sep  1 13:52:45.283 UTC: As2 LCP:     (0x131301B07502C88EC4420014BE1FC155)
Sep  1 13:52:45.283 UTC: As2 LCP:     (0x370000)
Sep  1 13:52:45.283 UTC: As2 LCP: O CONFREJ [ACKrcvd] id 4 len 7
Sep  1 13:52:45.283 UTC: As2 LCP:    Callback 6  (0x0D0306)
Sep  1 13:52:45.475 UTC: As2 LCP: I CONFREQ [ACKrcvd] id 5 len 43
Sep  1 13:52:45.475 UTC: As2 LCP:    ACCM 0x000A0000 (0x0206000A0000)
Sep  1 13:52:45.475 UTC: As2 LCP:    MagicNumber 0x0042C48F (0x05060042C48F)
Sep  1 13:52:45.475 UTC: As2 LCP:    PFC (0x0702)
Sep  1 13:52:45.475 UTC: As2 LCP:    ACFC (0x0802)
Sep  1 13:52:45.475 UTC: As2 LCP:    MRRU 1500 (0x110405DC)
Sep  1 13:52:45.475 UTC: As2 LCP:    EndpointDisc 1 Local
Sep  1 13:52:45.475 UTC: As2 LCP:     (0x131301B07502C88EC4420014BE1FC155)
Sep  1 13:52:45.475 UTC: As2 LCP:     (0x370000)
Sep  1 13:52:45.475 UTC: As2 LCP: O CONFACK [ACKrcvd] id 5 len 43
Sep  1 13:52:45.475 UTC: As2 LCP:    ACCM 0x000A0000 (0x0206000A0000)
Sep  1 13:52:45.475 UTC: As2 LCP:    MagicNumber 0x0042C48F (0x05060042C48F)
Sep  1 13:52:45.475 UTC: As2 LCP:    PFC (0x0702)
Sep  1 13:52:45.475 UTC: As2 LCP:    ACFC (0x0802)
Sep  1 13:52:45.475 UTC: As2 LCP:    MRRU 1500 (0x110405DC)
Sep  1 13:52:45.475 UTC: As2 LCP:    EndpointDisc 1 Local
Sep  1 13:52:45.475 UTC: As2 LCP:     (0x131301B07502C88EC4420014BE1FC155)
Sep  1 13:52:45.475 UTC: As2 LCP:     (0x370000)
Sep  1 13:52:45.475 UTC: As2 LCP: State is Open
Sep  1 13:52:45.475 UTC: As2 PPP: Phase is AUTHENTICATING, by this end
Sep  1 13:52:45.475 UTC: As2 CHAP: O CHALLENGE id 5 len 36 from "NAS"
Sep  1 13:52:45.667 UTC: As2 CHAP: I RESPONSE id 5 len 37 from "clearlake-lan-01"
Sep  1 13:52:45.667 UTC: As2 CHAP: O SUCCESS id 5 len 4
Sep  1 13:52:45.667 UTC: As2 MLP: Multilink up event pending
Sep  1 13:52:45.667 UTC: As2 PPP: Phase is VIRTUALIZED
Sep  1 13:52:45.667 UTC: Vi1 PPP: Phase is DOWN, Setup
Sep  1 13:52:45.667 UTC: Vi1 MLP: VP: Clone from Vtemplate 1 block=1
Sep  1 13:52:45.767 UTC: Vi1 PPP: Treating connection as a dedicated line
Sep  1 13:52:45.767 UTC: Vi1 PPP: Phase is ESTABLISHING, Active Open
Sep  1 13:52:45.771 UTC: Vi1 LCP: O CONFREQ [Closed] id 1 len 37
Sep  1 13:52:45.771 UTC: Vi1 LCP:    AuthProto CHAP (0x0305C22305)
Sep  1 13:52:45.771 UTC: Vi1 LCP:    MagicNumber 0xA53BD9C1 (0x0506A53BD9C1)
Sep  1 13:52:45.771 UTC: Vi1 LCP:    MRRU 1524 (0x110405F4)
Sep  1 13:52:45.771 UTC: Vi1 LCP:    EndpointDisc 1 Local
Sep  1 13:52:45.771 UTC: Vi1 LCP:     (0x131201626F62736C616B652D6E61732D)
Sep  1 13:52:45.771 UTC: Vi1 LCP:     (0x3031)
Sep  1 13:52:45.771 UTC: Vi1 PPP: Phase is UP
Sep  1 13:52:45.771 UTC: Vi1 IPCP: O CONFREQ [Closed] id 1 len 10
Sep  1 13:52:45.771 UTC: Vi1 IPCP:    Address 172.21.104.254 (0x0306AC1568FE)
Sep  1 13:52:45.771 UTC: As2 MLP: clearlake-lan-01/b07502c88ec4420014be1fc155370000,
multilink up, first link
Sep  1 13:52:45.771 UTC: As2 IPCP: Remove route to 172.21.104.25
Sep  1 13:52:45.843 UTC: Vi1 IPCP: I CONFREQ [REQsent] id 1 len 40
Sep  1 13:52:45.843 UTC: Vi1 IPCP:    CompressType VJ 15 slots CompressSlotID
(0x0206002D0F01)
Sep  1 13:52:45.843 UTC: Vi1 IPCP:    Address 0.0.0.0 (0x030600000000)
Sep  1 13:52:45.843 UTC: Vi1 IPCP:    PrimaryDNS 0.0.0.0 (0x810600000000)
Sep  1 13:52:45.843 UTC: Vi1 IPCP:    PrimaryWINS 0.0.0.0 (0x820600000000)
Sep  1 13:52:45.843 UTC: Vi1 IPCP:    SecondaryDNS 0.0.0.0 (0x830600000000)
Sep  1 13:52:45.843 UTC: Vi1 IPCP:    SecondaryWINS 0.0.0.0 (0x840600000000)
Sep  1 13:52:45.843 UTC: Vi1 IPCP: Pool returned 172.21.104.48
Sep  1 13:52:45.843 UTC: Vi1 IPCP: O CONFREJ [REQsent] id 1 len 22
Sep  1 13:52:45.843 UTC: Vi1 IPCP:    CompressType VJ 15 slots CompressSlotID
(0x0206002D0F01)
```

```
Sep  1 13:52:45.843 UTC: Vi1 IPCP:    PrimaryWINS 0.0.0.0 (0x820600000000)
Sep  1 13:52:45.843 UTC: Vi1 IPCP:    SecondaryWINS 0.0.0.0 (0x840600000000)
Sep  1 13:52:45.843 UTC: Vi1 CCP: I CONFREQ [Not negotiated] id 1 len 15
Sep  1 13:52:45.843 UTC: Vi1 CCP:    MS-PPC supported bits 0x00000001
(0x120600000001)
Sep  1 13:52:45.843 UTC: Vi1 CCP:    Stacker history 1 check mode EXTENDED
(0x1105000104)
Sep  1 13:52:45.843 UTC: Vi1 LCP: O PROTREJ [Open] id 2 len 21 protocol CCP
Sep  1 13:52:45.843 UTC: Vi1 LCP:  (0x80FD0101000F12060000000111050001)
Sep  1 13:52:45.843 UTC: Vi1 LCP:  (0x04)
Sep  1 13:52:45.939 UTC: Vi1 IPCP: I CONFACK [REQsent] id 1 len 10
Sep  1 13:52:45.939 UTC: Vi1 IPCP:    Address 172.21.104.254 (0x0306AC1568FE)
Sep  1 13:52:47.771 UTC: Vi1 IPCP: TIMEout: State ACKrcvd
Sep  1 13:52:47.771 UTC: Vi1 IPCP: O CONFREQ [ACKrcvd] id 2 len 10
Sep  1 13:52:47.771 UTC: Vi1 IPCP:    Address 172.21.104.254 (0x0306AC1568FE)
Sep  1 13:52:47.923 UTC: Vi1 IPCP: I CONFACK [REQsent] id 2 len 10
Sep  1 13:52:47.923 UTC: Vi1 IPCP:    Address 172.21.104.254 (0x0306AC1568FE)
Sep  1 13:52:48.835 UTC: Vi1 IPCP: I CONFREQ [ACKrcvd] id 2 len 34
Sep  1 13:52:48.835 UTC: Vi1 IPCP:    Address 0.0.0.0 (0x030600000000)
Sep  1 13:52:48.835 UTC: Vi1 IPCP:    PrimaryDNS 0.0.0.0 (0x810600000000)
Sep  1 13:52:48.835 UTC: Vi1 IPCP:    PrimaryWINS 0.0.0.0 (0x820600000000)
Sep  1 13:52:48.835 UTC: Vi1 IPCP:    SecondaryDNS 0.0.0.0 (0x830600000000)
Sep  1 13:52:48.835 UTC: Vi1 IPCP:    SecondaryWINS 0.0.0.0 (0x840600000000)
Sep  1 13:52:48.835 UTC: Vi1 IPCP: O CONFREJ [ACKrcvd] id 2 len 16
Sep  1 13:52:48.835 UTC: Vi1 IPCP:    PrimaryWINS 0.0.0.0 (0x820600000000)
Sep  1 13:52:48.835 UTC: Vi1 IPCP:    SecondaryWINS 0.0.0.0 (0x840600000000)
Sep  1 13:52:49.011 UTC: Vi1 IPCP: I CONFREQ [ACKrcvd] id 3 len 22
Sep  1 13:52:49.011 UTC: Vi1 IPCP:    Address 0.0.0.0 (0x030600000000)
Sep  1 13:52:49.011 UTC: Vi1 IPCP:    PrimaryDNS 0.0.0.0 (0x810600000000)
Sep  1 13:52:49.011 UTC: Vi1 IPCP:    SecondaryDNS 0.0.0.0 (0x830600000000)
Sep  1 13:52:49.011 UTC: Vi1 IPCP: O CONFNAK [ACKrcvd] id 3 len 22
Sep  1 13:52:49.011 UTC: Vi1 IPCP:    Address 172.21.104.48 (0x0306AC156830)
Sep  1 13:52:49.011 UTC: Vi1 IPCP:    PrimaryDNS 172.22.53.210 (0x8106AC1635D2)
Sep  1 13:52:49.011 UTC: Vi1 IPCP:    SecondaryDNS 171.68.10.70 (0x8306AB440A46)
Sep  1 13:52:49.203 UTC: Vi1 IPCP: I CONFREQ [ACKrcvd] id 4 len 22
Sep  1 13:52:49.203 UTC: Vi1 IPCP:    Address 172.21.104.48 (0x0306AC156830)
Sep  1 13:52:49.203 UTC: Vi1 IPCP:    PrimaryDNS 172.22.53.210 (0x8106AC1635D2)
Sep  1 13:52:49.203 UTC: Vi1 IPCP:    SecondaryDNS 171.68.10.70 (0x8306AB440A46)
Sep  1 13:52:49.203 UTC: Vi1 IPCP: O CONFACK [ACKrcvd] id 4 len 22
Sep  1 13:52:49.203 UTC: Vi1 IPCP:    Address 172.21.104.48 (0x0306AC156830)
Sep  1 13:52:49.203 UTC: Vi1 IPCP:    PrimaryDNS 172.22.53.210 (0x8106AC1635D2)
Sep  1 13:52:49.203 UTC: Vi1 IPCP:    SecondaryDNS 171.68.10.70 (0x8306AB440A46)
Sep  1 13:52:49.207 UTC: Vi1 IPCP: State is Open
Sep  1 13:52:49.207 UTC: Vi1 IPCP: Install route to 172.21.104.48
NAS#
NAS#
Sep  1 13:53:41.928 UTC: As5 IPCP: Install route to 172.21.104.24
Sep  1 13:53:43.928 UTC: As5 PPP: Treating connection as a callin
Sep  1 13:53:43.928 UTC: As5 PPP: Phase is ESTABLISHING, Passive Open
Sep  1 13:53:43.928 UTC: As5 LCP: State is Listen
Sep  1 13:53:44.792 UTC: As5 LCP: I CONFREQ [Listen] id 3 len 46
Sep  1 13:53:44.792 UTC: As5 LCP:    ACCM 0x000A0000 (0x0206000A0000)
Sep  1 13:53:44.792 UTC: As5 LCP:    MagicNumber 0x0043B7F1 (0x05060043B7F1)
Sep  1 13:53:44.792 UTC: As5 LCP:    PFC (0x0702)
Sep  1 13:53:44.792 UTC: As5 LCP:    ACFC (0x0802)
Sep  1 13:53:44.792 UTC: As5 LCP:    Callback 6  (0x0D0306)
Sep  1 13:53:44.792 UTC: As5 LCP:    MRRU 1500 (0x110405DC)
Sep  1 13:53:44.792 UTC: As5 LCP:    EndpointDisc 1 Local
Sep  1 13:53:44.792 UTC: As5 LCP:     (0x131301B07502C88EC4420014BE1FC155)
Sep  1 13:53:44.792 UTC: As5 LCP:     (0x370000)
Sep  1 13:53:44.792 UTC: As5 LCP: O CONFREQ [Listen] id 17 len 47
Sep  1 13:53:44.792 UTC: As5 LCP:    ACCM 0x000A0000 (0x0206000A0000)
Sep  1 13:53:44.792 UTC: As5 LCP:    AuthProto CHAP (0x0305C22305)
Sep  1 13:53:44.792 UTC: As5 LCP:    MagicNumber 0xA53CC053 (0x0506A53CC053)
```

```
Sep  1 13:53:44.792 UTC: As5 LCP:    PFC (0x0702)
Sep  1 13:53:44.792 UTC: As5 LCP:    ACFC (0x0802)
Sep  1 13:53:44.792 UTC: As5 LCP:    MRRU 1524 (0x110405F4)
Sep  1 13:53:44.796 UTC: As5 LCP:    EndpointDisc 1 Local
Sep  1 13:53:44.796 UTC: As5 LCP:     (0x131201626F62736C616B652D6E61732D)
Sep  1 13:53:44.796 UTC: As5 LCP:     (0x3031)
Sep  1 13:53:44.796 UTC: As5 LCP: O CONFREJ [Listen] id 3 len 7
Sep  1 13:53:44.796 UTC: As5 LCP:    Callback 6  (0x0D0306)
Sep  1 13:53:46.792 UTC: As5 LCP: TIMEout: State REQsent
Sep  1 13:53:46.792 UTC: As5 LCP: O CONFREQ [REQsent] id 18 len 47
Sep  1 13:53:46.792 UTC: As5 LCP:    ACCM 0x000A0000 (0x0206000A0000)
Sep  1 13:53:46.792 UTC: As5 LCP:    AuthProto CHAP (0x0305C22305)
Sep  1 13:53:46.792 UTC: As5 LCP:    MagicNumber 0xA53CC053 (0x0506A53CC053)
Sep  1 13:53:46.792 UTC: As5 LCP:    PFC (0x0702)
Sep  1 13:53:46.792 UTC: As5 LCP:    ACFC (0x0802)
Sep  1 13:53:46.792 UTC: As5 LCP:    MRRU 1524 (0x110405F4)
Sep  1 13:53:46.792 UTC: As5 LCP:    EndpointDisc 1 Local
Sep  1 13:53:46.792 UTC: As5 LCP:     (0x131201626F62736C616B652D6E61732D)
Sep  1 13:53:46.792 UTC: As5 LCP:     (0x3031)
Sep  1 13:53:47.032 UTC: As5 LCP: I CONFACK [REQsent] id 18 len 47
Sep  1 13:53:47.032 UTC: As5 LCP:    ACCM 0x000A0000 (0x0206000A0000)
Sep  1 13:53:47.032 UTC: As5 LCP:    AuthProto CHAP (0x0305C22305)
Sep  1 13:53:47.032 UTC: As5 LCP:    MagicNumber 0xA53CC053 (0x0506A53CC053)
Sep  1 13:53:47.032 UTC: As5 LCP:    PFC (0x0702)
Sep  1 13:53:47.032 UTC: As5 LCP:    ACFC (0x0802)
Sep  1 13:53:47.032 UTC: As5 LCP:    MRRU 1524 (0x110405F4)
Sep  1 13:53:47.032 UTC: As5 LCP:    EndpointDisc 1 Local
Sep  1 13:53:47.032 UTC: As5 LCP:     (0x131201626F62736C616B652D6E61732D)
Sep  1 13:53:47.032 UTC: As5 LCP:     (0x3031)
Sep  1 13:53:47.800 UTC: As5 LCP: I CONFREQ [ACKrcvd] id 4 len 46
Sep  1 13:53:47.800 UTC: As5 LCP:    ACCM 0x000A0000 (0x0206000A0000)
Sep  1 13:53:47.800 UTC: As5 LCP:    MagicNumber 0x0043B7F1 (0x05060043B7F1)
Sep  1 13:53:47.800 UTC: As5 LCP:    PFC (0x0702)
Sep  1 13:53:47.800 UTC: As5 LCP:    ACFC (0x0802)
Sep  1 13:53:47.800 UTC: As5 LCP:    Callback 6  (0x0D0306)
Sep  1 13:53:47.800 UTC: As5 LCP:    MRRU 1500 (0x110405DC)
Sep  1 13:53:47.804 UTC: As5 LCP:    EndpointDisc 1 Local
Sep  1 13:53:47.804 UTC: As5 LCP:     (0x131301B07502C88EC4420014BE1FC155)
Sep  1 13:53:47.804 UTC: As5 LCP:     (0x370000)
Sep  1 13:53:47.804 UTC: As5 LCP: O CONFREJ [ACKrcvd] id 4 len 7
Sep  1 13:53:47.804 UTC: As5 LCP:    Callback 6  (0x0D0306)
Sep  1 13:53:48.008 UTC: As5 LCP: I CONFREQ [ACKrcvd] id 5 len 43
Sep  1 13:53:48.008 UTC: As5 LCP:    ACCM 0x000A0000 (0x0206000A0000)
Sep  1 13:53:48.008 UTC: As5 LCP:    MagicNumber 0x0043B7F1 (0x05060043B7F1)
Sep  1 13:53:48.008 UTC: As5 LCP:    PFC (0x0702)
Sep  1 13:53:48.008 UTC: As5 LCP:    ACFC (0x0802)
Sep  1 13:53:48.008 UTC: As5 LCP:    MRRU 1500 (0x110405DC)
Sep  1 13:53:48.012 UTC: As5 LCP:    EndpointDisc 1 Local
Sep  1 13:53:48.012 UTC: As5 LCP:     (0x131301B07502C88EC4420014BE1FC155)
Sep  1 13:53:48.012 UTC: As5 LCP:     (0x370000)
Sep  1 13:53:48.012 UTC: As5 LCP: O CONFACK [ACKrcvd] id 5 len 43
Sep  1 13:53:48.012 UTC: As5 LCP:    ACCM 0x000A0000 (0x0206000A0000)
Sep  1 13:53:48.012 UTC: As5 LCP:    MagicNumber 0x0043B7F1 (0x05060043B7F1)
Sep  1 13:53:48.012 UTC: As5 LCP:    PFC (0x0702)
Sep  1 13:53:48.012 UTC: As5 LCP:    ACFC (0x0802)
Sep  1 13:53:48.012 UTC: As5 LCP:    MRRU 1500 (0x110405DC)
Sep  1 13:53:48.012 UTC: As5 LCP:    EndpointDisc 1 Local
Sep  1 13:53:48.012 UTC: As5 LCP:     (0x131301B07502C88EC4420014BE1FC155)
Sep  1 13:53:48.012 UTC: As5 LCP:     (0x370000)
Sep  1 13:53:48.012 UTC: As5 LCP: State is Open
Sep  1 13:53:48.012 UTC: As5 PPP: Phase is AUTHENTICATING, by this end
Sep  1 13:53:48.012 UTC: As5 CHAP: O CHALLENGE id 6 len 36 from "NAS"
Sep  1 13:53:48.264 UTC: As5 CHAP: I RESPONSE id 6 len 37 from "clearlake-lan-01"
Sep  1 13:53:48.268 UTC: As5 CHAP: O SUCCESS id 6 len 4
```

```
Sep  1 13:53:48.268 UTC: As5 MLP: Multilink up event pending
Sep  1 13:53:48.268 UTC: As5 PPP: Phase is VIRTUALIZED
Sep  1 13:53:48.268 UTC: As5 MLP: clearlake-lan-01/b07502c88ec4420014be1fc155370000,
multilink up
Sep  1 13:53:48.268 UTC: As5 IPCP: Remove route to 172.21.104.24
NAS#
NAS#
```

Refer to Table 2-3,Table 2-4 and Table 2-8 for related symptom, problem, and diagnostic notes.

3.7 Cisco IOS show processes cpu Command Output

In the following example command output, the CPU utilization is very low.

```
NAS#show processes cpu

CPU utilization for five seconds: 0%/0%; one minute: 0%; five minutes: 0%
 PID  Runtime(ms)  Invoked  uSecs    5Sec   1Min   5Min TTY Process
   1      110876  1344651     82   0.00%  0.00%  0.00%   0 Load Meter
   2         356     3895     91   0.24%  0.02%  0.00%  50 Virtual Exec
   3     6619420   904515   7318   0.00%  0.06%  0.06%   0 Check heaps
```

Refer to Table 2-3 and Table 2-5 for related symptom, problem, and diagnostic notes.

3.8 Cisco IOS show ip route Command Output

The following **show ip route** *client-IP-address* Cisco IOS command output illustrates the use of this command to determine whether a route to a specific IP address exists. In this case, the route exists and is directly connected via *Virtual-Access1*.

```
NAS#show ip route 172.21.104.48
Routing entry for 172.21.104.48/32
  Known via "connected", distance 0, metric 0 (connected, via interface)
  Redistributing via eigrp 1
  Advertised by eigrp 1
  Routing Descriptor Blocks:
  * directly connected, via Virtual-Access1
      Route metric is 0, traffic share count is 1
```

Another option is to use the generic form of the command. However, using this command can result in a long output when large routing tables exist in a NAS or router. The following is an example of a **show ip route** output (with a very small routing table) where the client IP address (172.21.104.48) is found.

```
NAS#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is 172.21.101.1 to network 0.0.0.0
        172.21.0.0/16 is variably subnetted, 12 subnets, 2 masks
D       172.21.200.0/24 [90/284160] via 172.21.101.1, 3w6d, FastEthernet0
D       172.21.10.1/32 [90/156160] via 172.21.101.20, 2w6d, FastEthernet0
D       172.21.10.7/32 [90/412160] via 172.21.101.1, 2w6d, FastEthernet0
D       172.21.10.6/32 [90/156160] via 172.21.101.1, 6w0d, FastEthernet0
D       172.21.10.5/32 [90/412160] via 172.21.101.1, 3w6d, FastEthernet0
C       172.21.10.10/32 is directly connected, Loopback0
C       172.21.104.0/24 is directly connected, Loopback1
D       172.21.99.0/24 [90/309760] via 172.21.101.1, 3w6d, FastEthernet0
C       172.21.101.0/24 is directly connected, FastEthernet0
D       172.21.100.0/24 [90/309760] via 172.21.101.1, 3w6d, FastEthernet0
D       172.21.102.0/24 [90/309760] via 172.21.101.1, 2w6d, FastEthernet0
C       172.21.104.48/32 is directly connected, Virtual-Access1
D EX 172.22.0.0/16 [170/297272576] via 172.21.101.1, 3w6d, FastEthernet0
D*EX 0.0.0.0/0 [170/309760] via 172.21.101.1, 3w6d, FastEthernet0
```

Refer to Table 2-4 for related symptom, problem, and diagnostic notes.